

Industrial Development Subsidiary Agreement

REVIEW OF SPECIES
AVAILABLE FOR MARICULTURE
IN BRITISH COLUMBIA

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Research Report



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SHRIMP/PRAWNS, LOBSTER, CRAB

SHRIMP AND PRAWN CULTURE

Introduction

Prawns and shrimp are fished on the British Columbia coast. No attempt has been made to culture either in B.C., although some rearing work has been carried out by researchers.

Biological/Technological/Economic Issues

Culture of shrimp and prawns in British Columbia could be envisioned for local pandalids, probably the spot prawn, in either monoculture or polyculture systems, for example, with abalone or with salmon in pens (cf Neilson 1981). However, growth rates in British Columbia may be too low for commercial viability of monoculture (alluded to in Neilson 1981, and in Marliave pers. comm.; and concluded for elsewhere as well in Kelly et al 1977).

Polyculture possibilities may be somewhat better, since prawns could act as cleaners and scavengers as well as provide additional income in such systems; however, this is not possible without further work on a variety of biological, technological and economic problems. Examples include prawn cannibalism, which limits stocking densities in pens (Marliave pers. comm.), and temperature and salinity lethal limits of spot prawns in B.C. (Kelly et al 1977). Marliave (pers. comm.) indicates that the published report of unsuccessful spot prawn polyculture (Rensel and Prentice 1979) involved unacceptable salmon farming procedures, such as leaving the nets fouled and not removing dead fish. Thus, considerable work in a number of areas is needed before prawn monoculture or polyculture could be considered feasible.

Conclusions and Recommendations

Despite abundant literature and commercial success of shrimp and prawn culture elsewhere, it can be generally concluded that shrimp and prawn

culture in B.C. offers very little potential, in the short to medium term, since there seem to be major problems in growth rates, technology availability and economics of production.

While prawn and shrimp are of low priority at this time, a more thorough evaluation of the data presented by Neilson and others is probably warranted.

LOBSTER

Introduction

The American lobster (Homarus americanus) is not native to British Columbia. "At least ten major transplant attempts over a 75 year period" were carried out by Department of Fisheries and Oceans using lobsters from the Atlantic coast (cf Carefoot 1977), but none of these were successful.

History

Two kinds of lobsters may be considered for mariculture: the clawed lobster (Homarus americanus in North America) and the clawless or spiny lobsters. Although some experimental culture work on spiny lobsters has been done in the U.S., Japan, and Australia (Bardach et al 1972, Cobb and Phillips 1980), culture technology for these species is not sufficiently developed to be encouraging for aquaculture in the near future. Culture work on clawed lobsters is much more advanced.

The methodology of culture and holding in captivity seems to be well established on the east coast. In addition, a considerable amount of work has been done at the University of California, Bodega Bay site. While this is not intended as a commercial operation, the cost of production of \$44 per kg., according to one account, seems high. Considerable work has been done on feed, genetics and engineering culture systems.

The optimum biological conditions for growth are:

- temperature between 15 and 20 degrees Celsius (growth stops at 4 degrees or lower)
- salinity above 22 parts. (Jamieson pers. comm.).

Extensive hatchery work has been carried out on the east coast. Knowledge of gaffkemyia, and the methods for preventing its spread (a vaccine is close to production as well), is growing. While fish waste (e.g. cod heads) will keep lobster alive, krill and red crab is needed to balance the diet. Lobster culture might well concentrate on producing a "scampi" sized animal of about 250 g. at less than 2 years of age, compared with a full-sized lobster at 4 or 5 years.

Lobster ponds in eastern Canada have had some success in growing small commercial sized animals for May/June through to December, with a doubling in size. One molt results in approximately a 25% increase in weight.

Broodstock is probably available and could be brought into B.C. It would be important to obtain approximate information on costs of production and selling price, as well as on demand and markets, to evaluate potential of lobster culture. Workshop participants expressed doubts as to the willingness of the Federal government to support a large scale development of lobster culture on the west coast for both political and biological reasons. In other words, it is presumed that the east coast fishery would have the first claim on any publicly funded culture or enhancement program.

Conclusions and Recommendations

1. The spiny lobster has little potential for culture at this time.

2. The clawed lobster has potential for culture in B.C., provided that solutions can be found to the following problems:
 - cost of augmenting water temperature
 - diet cost
 - the possibility of gaffkemyia infections
 - changes in salinity in open water systems.
3. Questions remain as to the political ramifications of attempting lobster culture in B.C.

CRAB

A short discussion was held during the workshop on the mariculture potential of crabs. No attempts have been made to culture either Dungeness (Cancer magister) or Graceful (Cancer gracilis) crab in B.C. T. Butler mentioned attempts made in Humboldt Bay to hold sublegals for the time required for a final molt, after which they attain legal size. They were fed scrap fish; subsequently, they stopped eating but resumed eating and gained weight when shrimp waste was added to their diet. Costs of feed may be too high to be supported by the present selling price of \$1.40 per lb. for Dungeness crab, which was reported at the workshops. These cost relationships, as well as demand and markets, should be investigated on the basis of existing information for a further evaluation of potential.

The Graceful crab may be culturable but there is no data on growth rates; females in nature reach maturity (3-4 inches) in about three years (Butler).

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